

**NEW JERSEY DEPARTMENT OF AGRICULTURE
FOREST PEST REPORTER**

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THE GYPSY MOTH PROBLEM IN NEW JERSEY

History

The gypsy moth is the most destructive forest insect pest New Jersey has yet encountered. The pest is not native to New Jersey but instead arrived, via wind-borne caterpillars, from the New England states during the late 1950s. The first gypsy moth cooperative aerial suppression program, organized in 1970, involved the spraying of 78,500 acres in 24 municipalities. Each year since 1970 NJDA has cooperated with local municipalities in organizing aerial spraying to reduce tree loss and larval nuisance problems associated with gypsy moth outbreaks.

New Jersey has suffered through three cycles of the gypsy moth since 1966 and we are currently at the first stage of the fourth major cycle. The first defoliation cycle peaked in 1973 when 258,000 acres were defoliated statewide. Another major cycle peaked in 1981 when 798,000 acres -- nearly 80 percent of the state's hardwood forests -- were defoliated. The third cycle reached its peak in 1990 when 431,200 acres were defoliated.

Until 2000, the pest remained below 40,000 defoliated acres due to a large part to the widespread occurrence and impact of a new fungal pathogen called *Entomophaga maimaiga*, which arrived in New Jersey in 1989. This disease has had the greatest impact of any natural agent ever found in the state.

For some years, it almost completely suppressed gypsy moth populations in the highly-susceptible oak forests in the northern half of the state and played an important part in reducing consecutive years of heavy defoliation in the southern half. However, during the past few years, dry spring weather has reduced *Entomophaga maimaiga*'s success in reducing gypsy moth populations. As a result the populations have increased dramatically from a low of 1,380 acres in 1999 to nearly 140,840 acres in 2001, representing the beginning of the fourth major cycle of the pest.

NJDA has clearly established from earlier ground site studies on the Newark Watershed and in the Morristown National Historical Park that repeated gypsy moth defoliations can kill large numbers of oaks. However, last year for the first time, NJDA documented in Holland Township, Hunterdon County, that even a single severe defoliation of oak can have devastating consequences. Along one street (Oak Lane) three white oaks and three red oaks, varying between 18 and 36 inches in diameter, were killed after a single defoliation. This loss after a single defoliation is unusual but the trees were weakened by prior years of drought.

In addition, aerial and ground surveys over parts of Passaic and Bergen counties last summer showed extensive losses of oak (40 percent or more) in areas where no spraying was conducted. Again, the past two years of dry summer weather, combined with two years of severe gypsy moth defoliation, contributed to massive losses involving hundreds of thousands of trees.

The goal of aerial spraying is to reduce tree loss during peak outbreak cycles. Since its inception, the cooperative gypsy moth suppression program has targeted for protection the highly susceptible trees growing in residential and recreational areas. We depend on natural factors, such as parasitoids, predators and disease, to reduce the defoliation problem in the generally uninhabited forests.

NJDA's Biological Evaluation of Gypsy Moth Outbreak

The purpose of a biological evaluation is to gather, analyze and interpret aerial and ground survey data so that NJDA staff can decide how to reduce the impacts of the gypsy moth on forested residential and recreational areas. A biological evaluation also helps to insure that treatment funds are not used in woodlands with little or no infestation.

Each year NJDA conducts extensive and intensive ground egg mass samplings in municipalities which request them so that spray is applied to susceptible forested areas only when necessary and only where needed.

The process begins during late June and July with a statewide aerial sketch-mapping survey of gypsy moth-defoliated areas. All municipalities where defoliation is observed are asked if they would like NJDA to conduct an egg mass survey to determine possible spray blocks for the coming year. If the municipality accepts the offer, inspectors complete their surveys from August through December.

Using municipal maps, inspectors sketch in all defoliated areas in the towns. Egg mass surveys are done first in residential areas. Inspectors use 1/40 acre, fixed-radius plots to determine the level of gypsy moth infestation. When a sample site exceeds 500 egg masses per acre, it is considered a positive site.

Normally, in severe outbreaks, survey points are established anywhere from a quarter- to a half-mile apart. In marginal populations, the survey plots are normally spaced closer together and more plots are needed to determine whether or not the area qualifies for spraying.

Inspectors look for any signs of natural biological pressures which could result in a collapse of the gypsy moth population. By examining the pupal cases for parasitoid emergence holes, checking the size of the egg mass and examining bark for evidence of diseased, killed larvae, they can determine the relative activity of natural control agents. By comparing the ratio of new to old egg masses on the lower six feet of the tree bole, they can also determine the population trend in the past season.

In areas where these natural biological factors have kept egg counts below 500 per acre, no spraying is recommended. In areas where egg counts exceed 500 per acre and moderate to severe defoliation is expected to occur on host trees, spraying is recommended. However, the final decision to treat a residential or recreational forest for control of the gypsy moth rests solely with the local governing body. Participation in the program is completely voluntary on the part of the municipality and they must contribute about 50 percent of the cost of spraying as well as take responsibility for notifying residents of the date of treatment.

Thirty-three Municipalities Accept NJDA Treatment Recommendation for 23,308 Acres

A total of 81 municipalities in 16 counties requested gypsy moth egg mass surveys last year. In all, 952,952 acres of forests were surveyed using 23,348 1/40th-acre sampling sites to determine the current status of the gypsy moth infestation. Of the municipalities surveyed, 36 met the criteria for aerial spraying with *Bacillus thuringiensis, var.kurstaki, (B.t.k.)* and three opted not to treat.

That brings the 2002 spray program to just over 23,300 acres at a dosage rate of 36 *B.I.U.s* per acre, a higher dosage than in other years to better cope with the higher gypsy moth populations. In six treatment blocks in Burlington and Warren counties, a double application of B.t. has been recommended since egg mass counts exceeded more than 4,000 per acre.

This tree protection program should begin on or about May 1, 2002, weather permitting. A complete summary of the acres to be treated, by municipality and county is shown in the following table.

GYPSY MOTH SPRAY BLOCKS - 2002 (single application recommended)		
County/Municipality	Number of Blocks	Acres
Bergen County (3,330 Ac)		
<i>Oakland Borough</i>	4	2,284
<i>Ridgewood Village</i>	1	121
<i>Washington Township</i>	2	925
Burlington County (4,072 Ac)		
<i>Bass River Township</i>	1	139
<i>Evesham Township</i>	1	65
<i>Medford Township</i>	10	1,254
<i>Medford Lakes Borough</i>	3	185
<i>Mount Laurel Township</i>	1	54
<i>Pemberton Township</i>	1	66
<i>Shamong Township</i>	4	485
<i>Southampton Township</i>	6	843
<i>Tabernacle Township</i>	4	981
Cape May County (137 Ac)		
<i>Dennis Township</i>	1	137
Hunterdon County (385 Ac)		
<i>Alexandria Township</i>	1	347
<i>Union Township</i>	1	38
Morris County (2,312 Ac)		
<i>Kinnelon Borough</i>	4	1,550
<i>Pequannock Township</i>	1	120
<i>Rockaway Township</i>	5	642
Ocean County (740 Ac)		
<i>Brick Township</i>	2	267
<i>Lakewood Township</i>	2	273
<i>Ocean County Park</i>	1	200
Passaic County (10,134 Ac)		
<i>Bloomington Borough</i>	2	1,244
<i>Ringwood Borough</i>	3	5,480
<i>West Milford Township</i>	6	2,343
<i>Wanaque Borough</i>	4	1,067
Salem County (364 Ac)		
<i>Carneys Point Township</i>	2	56
<i>Oldmans Township</i>	5	151
<i>Upper Pittsgrove Township</i>	1	157
Sussex County (1,127 Ac)		
<i>Andover Township</i>	2	547
<i>Byram Township</i>	1	329
<i>Sparta Township</i>	3	251
Warren County (325 Ac)		
<i>Blairstown Township</i>	1	227
<i>Greenwich Township</i>	1	98
Totals 10 Counties 33 Municipalities	87	22,926

GYPSY MOTH SPRAY BLOCKS – 2002 (double application recommended)		
County/Municipality	NUMBER BLOCKS	ACRES
Burlington County		
<i>Pemberton Township</i>	1	66
<i>Shamong Township</i>	2	353
<i>Southampton Township</i>	1	62
<i>Tabernacle Township</i>	1	55
Warren County		
<i>Blairstown Township</i>	1	227
	6	763

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